

**IN THE CLAIMS:**

- 1 1. (Currently Amended) A method for partitioning a pattern into optimized sub-  
2 patterns, the method comprising:  
3 providing a list of features of the pattern;  
4 generating a set of candidate partitions using the list of features of the pattern;  
5 scoring each candidate partition of the set of candidate partitions by building sub-  
6 patterns using the set of candidate partitions, wherein each candidate partition is scored  
7 using a scoring function based on characteristics of a sub-pattern derived therefrom and  
8 wherein the characteristics of the sub-pattern includes an overall "suitability" of the sub-  
9 pattern used as a search pattern applied to the original pattern wherein the scoring  
10 ~~includes analyzing an overall suitability of each sub-pattern;~~  
11 determining a best-scoring partition among the set of candidate partitions;  
12 applying the best-scoring partition to the list of features so as to provide a  
13 plurality of sub-lists of features respectively representing a plurality of optimized sub-  
14 patterns.
- 1 2. (Original) The method of claim 1, wherein providing a list of features includes:  
2 using at least one sub-list from the plurality of sub-lists of features generated by  
3 an earlier application of the method as the list of features of the pattern.
- 1 3. (Original) The method of claim 1, wherein providing a list of features of the pattern  
2 includes:  
3 providing an image; and  
4 extracting a list of features from the image.
- 1 4. (Original) The method of claim 3, wherein extracting a list of features from the  
2 images includes:  
3 sampling the image so as to provide a regular array of pixels.

- 1 5. (Original) The method of claim 3, wherein extracting a list of features from the  
2 images includes:  
3 using an edge extraction method to provide an edge image; and  
4 sampling the edge image to provide a plurality of edge feature points.
- 1 6. (Original) The method of claim 5, wherein each edge feature point includes the angle  
2 of the edge at that edge feature point.
- 1 7. (Original) The method of claim 1, wherein features of the pattern are 2D image  
2 points.
- 1 8. (Original) The method of claim 1, wherein features of the pattern are points of any  
2 dimensionality.
- 1 9. (Original) The method of claim 1, wherein providing a list of features includes:  
2 providing an abstract pattern description; and  
3 extracting a list of features from the abstract pattern description.
- 1 10. (Original) The method of claim 1, wherein providing a list of features includes:  
2 providing a pre-generated list of features.
- 1 11. (Original) The method of claim 1, wherein generating a set of candidate partitions  
2 using the list of features of the pattern includes:  
3 using a clustering algorithm.
- 1 12. (Original) The method of claim 1, wherein generating a set of candidate partitions  
2 using the list of features of the pattern includes:  
3 using a spatial subdivision algorithm.
- 1 13. (Original) The method of claim 1, wherein generating a set of candidate partitions  
2 using the list of features of the pattern includes:

3           using a method that yields sub-lists that include pattern features that span an area  
4 of the pattern that is spatially small with respect to the area of the entire pattern.

1   14. (Original) The method of claim 1, wherein generating a set of candidate partitions  
2 using the list of features of the pattern includes:

3           using a method that provides sub-lists having pattern features that are more near  
4 to each other than to pattern features in other sub-lists.

1   15. (Original) The method of claim 1, wherein generating a set of candidate partitions  
2 using the list of features of the pattern includes:

3           building a weighted graph using the list of features of the pattern; and  
4           partitioning the weighted graph to generate candidate partitions.

1   16. (Original) The method of claim 15, wherein building a weighted graph using the list  
2 of features of the pattern includes:

3           fully connecting the feature points to make a graph; and  
4           setting the weights on each link.

1   17. (Original) The method of claim 15, wherein building a weighted graph using the list  
2 of features of the pattern includes:

3           sparsely connecting the feature points to make a graph; and  
4           setting the weights on each link.

1   18. (Original) The method of claim 16, wherein the weights on each link are based on  
2 the distance between each pair of feature points.

1   19. (Original) The method of claim 18, wherein weights decrease as the distance  
2 between feature points increases.

1   20. (Original) The method of claim 16, wherein the weights on each link are based on at  
2 least one of similarity of angle and similarity of magnitude.

1 21. (Original) The method of claim 16, wherein the weights on each link are based on  
2 values associated with the feature points of the pattern.

1 22. (Original) The method of claim 16, wherein the weights on each link are determined  
2 such that:  
3 larger weights represent a pair of features that tend to be together in the same sub-  
4 lists of features; and  
5 smaller weights indicate a pair of features that can be included in different sub-  
6 lists of features.

1 23. (Original) The method of claim 15, wherein partitioning the weighted graph to  
2 generate candidate partitions includes:  
3 dividing the weighted graph into two sub-graphs, one of which may be empty;  
4 and  
5 converting the two sub-graphs into two sub-lists of features.

1 24. (Original) The method of claim 15, wherein partitioning the weighted graph to  
2 generate candidate partitions includes:  
3 partitioning the weighted graph using a “normalized cut” method to generate  
4 candidate partitions.

1 25. (Original) The method of claim 1, wherein in generating a set of candidate partitions  
2 using the list of features of the pattern, at least one candidate partition has only a single  
3 sub-list of features of the pattern.

1 26. (Original) The method of claim 1, wherein in generating a set of candidate partitions  
2 using the list of features of the pattern, each candidate partition has many sub-lists of  
3 features of the pattern.

1 27. (Original) The method of claim 1, wherein in generating a set of candidate partitions  
2 using the list of features of the pattern, some features included in the list of features of the  
3 pattern do not appear on any sub-list of features of the pattern.

1 28. (Original) The method of claim 1, wherein in generating a set of candidate partitions  
2 using the list of features of the pattern, at least one feature of the pattern appears on a  
3 plurality of sub-lists of features of the pattern.

1 29. (Cancelled)

1 30. (Currently Amended) The method of claim 29 1, wherein characteristics of the  
2 sub-pattern includes:  
3 spatial coherence of the features corresponding to the sub-pattern.

1 31. (Currently Amended) The method of claim 29 1, wherein characteristics of the  
2 sub-pattern includes:  
3 overall spatial size of the area spanned by the feature points corresponding to the  
4 sub-pattern.

1 32. (Original) The method of claim 31, wherein the area spanned by the feature points is  
2 represented by the smallest bounding box that includes all the feature points.

1 33. (Currently Amended) The method of claim 29 1, wherein characteristics of the  
2 sub-pattern includes:  
3 the number of feature points in the sub-pattern.

1 34. (Currently Amended) The method of claim 29 1, wherein characteristics of the  
2 sub-pattern includes:  
3 the total amount of weight in links "cut" by the partition algorithm to create the  
4 sub-pattern.

1 35. (Cancelled)

1 36. (Currently Amended) The method of claim ~~29~~ 1, wherein characteristics of the  
2 sub-pattern includes:  
3 spatial coherence of the features corresponding to the sub-pattern;  
4 overall spatial size of the area spanned by the feature points corresponding to the  
5 sub-pattern;  
6 the number of feature points in the sub-pattern;  
7 the total amount of weight in links "cut" by the partition algorithm to create the  
8 sub-pattern; and  
9 the overall "suitability" of the sub-pattern used as a search pattern applied to the  
10 original pattern.

1 37. (Currently Amended) The method of claim ~~35~~ 1, wherein the overall "suitability"  
2 of the sub-pattern used as a search pattern applied to the original pattern depends on:  
3 the search algorithm used.

1 38. (Currently Amended) The method of claim ~~35~~ 1, wherein the overall "suitability"  
2 of the sub-pattern used as a search pattern applied to the original pattern depends on:  
3 degeneracy of the features of a sub-pattern.

1 39. (Original) The method of claim ~~35~~ 1, wherein the overall "suitability" of the sub-  
2 pattern used as a search pattern applied to the original pattern depends on:  
3 redundancy of the sub-pattern within the original pattern.

1 40. (Original) The method of claim 1, wherein determining a best-scoring partition  
2 among the set of candidate partitions includes:  
3 using a partition score threshold.

1 41. (Original) The method of claim 40, wherein the partition score threshold is settable.

1 42. (Original) The method of claim 40, wherein the partition score threshold is  
2 predetermined.

1 43. (Original) The method of claim 40, wherein the partition score threshold includes a  
2 portion that is predetermined, and a portion that is settable.

1 44. (Original) The method of claim 40, wherein if no candidate partition has a score  
2 above the partition score threshold, then the list of features of the candidate partition is  
3 deemed to be one that cannot be usefully sub-divided.

1 45. (Cancelled)

1 46. (Currently Amended) A method for dividing a pattern into a plurality of sub-  
2 patterns, each sub-pattern being adapted for use with an image search method that can  
3 provide a plurality of sub-pattern search results, the method comprising:  
4 representing the pattern as a plurality of feature points;  
5 generating candidate partitions of the plurality of feature points;  
6 scoring the candidate partitions by examining characteristics of each potential  
7 sub-pattern of each candidate partition, ~~wherein the characteristics of each potential sub-~~  
8 ~~pattern comprises a suitability of the sub-pattern used as a search pattern applied to the~~  
9 ~~pattern, wherein each candidate partition is scored using a scoring function based on~~  
10 characteristics of a sub-pattern derived therefrom and wherein the characteristics of the  
11 sub-pattern includes an overall "suitability" of the sub-pattern used as a search pattern  
12 applied to the original pattern;  
13 selecting the highest-scoring partition;  
14 applying it to the plurality of feature points so as to create one or more sub-  
15 pluralities of feature points.

1 47. (Original) The method of claim 46, wherein the sub-pluralities of feature points are  
2 used as sub-patterns by an image search method that is adapted to use pluralities of  
3 feature points.

1 48. (Original) The method of claim 46, wherein the characteristics of each potential sub-  
2 pattern of each candidate partition include:  
3 area, number of feature points, and suitability of the sub-pattern for use with a  
4 particular search method.